2017 CROSSCUTTING RESEARCH PROJECT REVIEW

MONDAY MARCH 20

7:30 AM — REGISTRATION AND CONTINENTAL BREAKFAST

TRACK A (CROSSCUTTING)

	Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter
8:30 AM	1	Wireless Sensors	Robert Fryer	University of Texas at Arlington	Distributed Wireless Antenna Sensors for Boiler Condition Monitoring	Haiying Huang
				University of Connecticut	Wireless 3D Nanorod Composite Arrays-Based High-Temp Surface Acoustic Wave Sensors for Selective Gas Detection Through Machine Learning Algorithms	Dr. Yu Lei
				University of Connecticut	Metal Oxide/Nitride Heterostructured Nanowire Arrays for Ultra-Sensitive and Selective Multi-Mode High Temperature Gas Detection	Pu-Xian Gao
10:00 AM	**MORNING BREAK**					
10:30 AM	2	Novel Sensor Concepts	Sydni Credle	Sporian Microsystems Inc.	Advanced Ceramic Materials and Packaging Technologies for Realizing Sensors Operable in Advanced Energy Generation Systems	Yiping Liu
				Tech4Imaging	Adaptive Electrical Capacitance Volume Tomography for Real-Time Measurement of Solids Circulation Rate at High Temperatures	Qussai Marashdeh
11:30 AM	**LUNCH (on your own)**					
1:00 PM	3	Wireless Sensors	TBD	University of Maine System	High Temperature Integrated Gas and Temperature Wireless Microwave Acoustic Sensor System for Fossil Energy Applications	Mauricio Pereira da Cunha
				Washington State University	Low-Cost Efficient and Durable High Temperature Wireless Sensors by Direct Write Additive Manufacturing for Application in Fossil Energy Systems	Rahul Panat
				Siemens Corporation	Novel Temperature Sensors and Wireless Telemetry for Active Condition Monitoring of Advanced Gas Turbines	Anand Kulkarni
2:30 PM	**AFTERNOON BREAK**					
3:00 PM	4	Embedded Sensors	Otis Mills	West Virginia University Research Corporation	Smart Refractory Sensor Systems for Wireless Monitoring of Temperature, Health and Degradation of Slagging Gasifiers	Edward Sabolsky
				University of Texas at El Paso	Investigation of "Smart Parts" with Embedded Sensors for Energy System Applications	Yirong Lin
				University of Texas at El Paso	Metal Three Dimensional (3D) Printing of Low-Nitrous Oxide (NOX) Fuel Injectors with Integrated Temperature Sensors	Ahsan Choudhuri
				University of Missouri System	Additive Manufacture of Smart Parts with Embedded Sensors for In-Situ Monitoring in Advanced Energy Systems	Hai-Lung Tsai

TRACK B (CROSSCUTTING)

Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter
1	Advanced Manufacturing	Charles Miller	West Virginia University Research Corp	Ceramic High Temperature Thermoelectric Heat Exchanger and Heat Recuperators in the Power Generation Systems	Xueyan Song
			Edison Welding Institute, Inc.	Additive Manufacturing of Fuel Injectors	Mahdi Jamshidinia
			Mohawk Innovative Technology, Inc.	High Temperature Ceramic Heat Exchanger for Solid Oxide Fuel Cell	Hooshang Heshmat
2	Functional Materials	TBD	University of Tennessee	Developing Novel Multifunctional Materials for High-Efficiency Electrical Energy Storage	Feng Yuan Zhang
			Prairie View A&M University	Post Combustion Carbon Capture Using Polyethylenimine (PEI) Functionalized Titanate Nanotubes	Raghava R. Kommalapati
3	Functional Materials	Barbara Carney	Clark Atlanta University	Engineering Accessible Adsorption Sites in Metal Organic Frameworks for CO2 Capture	Conrad Ingram
			University of Nebraska	Vertically-Aligned Carbon-Nanotubes Embedded in Ceramic Matrices for Hot Electrode Applications	Yongfeng Lu
			Delaware State University	Novel Silica Nanostructured Platforms with Engineered Surface Functionality and Spherical Morphology for Low-Cost High-Efficiency Carbon Capture	Cheng-Yu Lai
4	MFIX	Jason Hissam	Arizona State University	MFIX-DEM PHI: Perf and Capability Improvements Towards Industrial Grade Open-Source DEM Framework w Integrated Uncertainty Quantification	Aytekin Gel
			University of North Dakota	Interfacing MFIX with PETSC and HYPRE Linear Solver Libraries	Gautham Krishnamoorthy
			University of Colorado	MFIX-DEM Enhancement for Industry-Relevant Flows	Christine Hrenya
			University of Texas at San Antonio	Use of an Accurate DNS Method to Derive, Validate and Supply Constitutive Equations for the MFIX Code	Zhi-Gang Feng

2017 CROSSCUTTING RESEARCH PROJECT REVIEW

TUESDAY MARCH 21

7:00 AM — **REGISTRATION AND CONTINENTAL BREAKFAST**

8:00 AM — **PLENARY SESSION**

8:00 AM	Welcome and NETL Overview	Dr. Grace Bochenek (Invited) Director, National Energy Technology Laboratory (NETL)
8:15 AM	Crosscutting Research Overview	Dr. Robert Romanosky Acting Technology Manager, Crosscutting Research & Analysis, NETL
8:30 AM	University Coalition for Fossil Energy Research	Dr. Chunshan Song Director, Energy Institute, Pennsylvania State University
9:00 AM	Technology Maturation in Power Generation	Steve Seachman Senior Technical Leader, EPRI
9:30 AM	Crosscutting Activities in Systems Engineering and Analysis	Travis Shultz Supervisor, Energy Process Analysis Team, NETL

10:00 AM — **MORNING BREAK**

TRACK A (CROSSCUTTING)

	Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter
10:30 AM	5	Optical Sensors	Karol Schrems	NETL - Research and Innovation Center	Optical Fiber Based Sensors for Future Fossil Energy Applications	Paul Ohodnicki
				University of Florida	High-Temperature Sapphire Pressure Sensors for Harsh Environments	Mark Sheplak

11:30 AM — **LUNCH (on your own)**

1:00 PM	6	Advanced Process Controls	Jessica Mullen	Ohio State University	Advanced Control Architecture and Sensor Information Development for Process Automation, Optimization, and Imaging of Chemical Looping Systems	Andrew Tong
				West Virginia University	Development of Integrated Biomimetic Framework with Intelligent Monitoring, Cognition and Decision Capabilities for Control of Advanced Energy Plants	Debangsu Bhattacharyya
				Ames National Laboratory	Sensors and Controls (Engineering of Complex Systems)	Mark Bryden

2:30 PM — **AFTERNOON BREAK**

3:00 PM	7	Wireless Sensors	Sydni Credle	West Virginia University	Passive Wireless Sensors Fabricated by Direct-Writing for Temperature and Health Monitoring of Energy Systems in Harsh-Environments	Edward Sabolsky
		Distributed Intelligent Controls		Ames National Laboratory	Sensors and Controls - Merged Environment for Simulation and Analysis IMESA	Mark Bryden
				Oregon State University	Evolving Robust and Reconfigurable Multi-Objective Controllers for Advanced Power Systems	Kagan Tumer

TRACK B (CROSSCUTTING)

	Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter
10:30 AM	5	Functional Materials	Barbara Carney	University of Illinois	Serration Behavior of High-Entropy Alloys	Karin Dahmen
				Auburn University	Reduced Cost Bond Layers for Multi-Layer Thermal/Environmental Barrier Coatings	Jeffrey Fergus

1:00 PM	6	Computational Materials	Rick Dunst	Oregon State University	New Mechanistic Models of Long Term Evolution of Microstructure and Mechanical Props of Nickel Based Alloys	Alex Greaney
				University of Tennessee	Computational Design and Perf Prediction of Creep-Resistant Ferritic Superalloys	Peter Liaw
				NETL - Research and Innovation Center	Oxidation and Microstructural Evolution: Computational Investigations & Model Development	Youhai Wen

3:00 PM	7	Computational Materials	Jason Hissam	NETL - Research and Innovation Center	Use of Data Analytics in Advanced Alloy Development: Trends and Modeling	Vyacheslav (Slava) Romanov
				Pennsylvania State University	Computational Design and Discovery of Ni-Based Alloys and Coatings: Thermodynamic Approaches Validated by Experiments	Zi-Kui Liu
				North Carolina State University	Rational Design of Mixed-Metal Oxides for Chemical Looping Combustion of Coal Via Computational Experimental Studies	Fanxing Li

POSTER SESSION (4:30 PM TO 6:00 PM)

2017 CROSSCUTTING RESEARCH PROJECT REVIEW

WEDNESDAY MARCH 22

7:30 AM — REGISTRATION AND CONTINENTAL BREAKFAST

TRACK A (CROSSCUTTING)

	Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter
8:30 AM	8	Optical Sensors	Jessica Mullen	University of Massachusetts	Distributed Fiber Sensing Systems for 3D Combustion Temperature Field Monitoring in Coal-Fired Boilers Using Optically Generated Acoustic Waves	Xingwei Wang
				University of Cincinnati	Robust Metal-Ceramic Coaxial Cable Sensors for Distributed Temp Monitoring in Harsh Environments of Fossil Energy Power Systems	Junhang Dong
				Virginia Polytechnic Institute and State University	Reduced Mode Sapphire Optical Fiber and Sensing System	Gary Pickrell
10:00 AM	**MORNING BREAK**					
10:30 AM	9	Systems Analysis	Robert Fryer	NETL - Energy Markets Analysis	Scenario Simulations of Potential Cost Savings from R&D in Sensors and Controls for Coal-Fired Power Plants	TBA
		SBE		NETL - Research and Innovation Center	Institute for the Design of Advanced Energy Systems (IDAES)	David Miller
11:30 AM	**LUNCH (on your own)**					
1:00 PM	10	Simulation-Based Engineering	Otis Mills	University of Texas at El Paso	High Fidelity Computational Model for Fluidized Bed Experiments	Vinod Kumar
				Ames National Laboratory	Kinetic Theory Modeling of Turbulent Multiphase Flow	Bo Kong
				NETL - Research and Innovation Center	Advancement of CFD-based Tools for Design and Optimization of Energy Devices	William Rogers
2:30 PM	**AFTERNOON BREAK**					
3:00 PM	11	Simulation-Based Engineering	Omer Bakshi	Process Systems Enterprise	Evaluation and Demonstration of Commercialization Potential of Carbon Capture Simulation Initiative Tools within GProms Advanced Simulation Platform	Alejandro Cano
				Ames National Laboratory	The SMARTER Project (Science of Multicomponent Alloys: Roadmap for Theoretical and Experimental Research)	Matthew Kramer
				Florida International University	Development of Reduced Order Model for Reacting Gas-Solids Flow Using Proper Orthogonal Decomposition	Dwayne McDaniel
		Data Modeling		SNL - Sandia National Laboratories	Exploring Energy-Water Issues in the United States	Vince Tidwell

TRACK B (CROSSCUTTING)

	Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter
8:30 AM	8	Systems Analysis	Karol Schrems	NETL - Energy Process Analysis	Update on Techno-Economic Viability of A-USC Systems	Travis Shultz
		Structural Materials		Electric Power Research Institute	Predicting the Oxidation/Corrosion Performance of Structural Alloys in Supercritical CO2	John Shingledecker
				NETL - Research and Innovation Center	Alloy Performance in sCO2 Environments: Effects of sCO2 Exposure	Omer Dogan
10:30 AM	9	Structural Materials	TBD	ANL - Argonne National Laboratory	Gas Turbine Materials Life Assessment and Non-Destructive Evaluation	Jiangang Sun
				ANL - Argonne National Laboratory	Development of Nondestructive Evaluation (NDE) Methods for Structural and Functional Materials	Jiangang Sun
1:00 PM	10	Structural Materials	TBD	NETL - Research and Innovation Center	Micro Channel Heat Exchangers based on Alloy 230: Exposure Characteristics and Mechanical Behavior	Omer Dogan
				ORNL - Oak Ridge National Laboratory	Creep-Fatigue-Oxidation Interactions: Predicting Alloy Lifetimes under Fossil Energy Service Conditions	Sebastien Dryepondt
				Electric Power Research Institute Inc.	Optimization of Advanced Steels for Cyclic Operation Through an Integration of Material Testing, Modeling and Novel Component Test Validation	John Siefert
3:00 PM	11	Computational Materials	Vito Cedro	INL - Idaho National Laboratory	Physics-based Creep Simulation of Thick Section Welds in High Temperature and Pressure Applications	Thomas M. Lillo
				ORNL - Oak Ridge National Laboratory	Advanced Alloy Design Concepts for High Temperature Fossil Energy Applications	Yukinori Yamamoto
				ORNL - Oak Ridge National Laboratory	Weldability of Creep Resistant Alloys for Advanced Power Plants	Zhili Feng
				Ames National Laboratory	Computational System Dynamics (Computational Design of Multiscale Systems)	Mark Bryden

2017 CROSSCUTTING RESEARCH PROJECT REVIEW

THURSDAY MARCH 23

7:30 AM — CONTINENTAL BREAKFAST

TRACK A (CROSSCUTTING)

	Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter
8:30 AM	12	Water Treatment & Reuse	Barbara Carney	Ohio University	Advanced Integrated Technologies for Treatment and Reutilization of Impaired Water in Fossil Fuel-Based Power Plant Systems	Jason Trembly
				GE Global Research	Model-Based Extracted Water Desalination System for Carbon Sequestration	Elizabeth Dees
				NETL - Research and Innovation Center	Water Management for Power Systems Research	Nick Siefert Jason Arena
10:00 AM — MORNING BREAK						
10:30 AM	13	Water Treatment & Reuse	Jessica Mullen	Research Triangle Institute	Low-Energy Water Recovery from Subsurface Brines	Young Chul Choi
				LANL - Los Alamos National Laboratory	Advanced Thermally Robust Membranes for High Salinity Produced Brine Treatment	Kathryn A. Berchtold
11:30 AM — LUNCH (on your own)						
1:00 PM	14	Water Treatment & Reuse	Maria Reidpath	University of Pittsburgh	Development of Membrane Distillation Technology Utilizing Waste Heat for Treatment of High Salinity Wastewaters	Radisav Vidic
				Southern Research Institute	Treatment of Produced Water from Carbon Sequestration Sites for Water Reuse, Mineral Recovery and Carbon Utilization	Jay Renew
				Research Triangle Institute	Fouling-Resistant Membranes for Treating Concentrated Brines for Water Reuse in Advanced Energy Systems	Zachary Hendren
2:30 PM — AFTERNOON BREAK						
3:00 PM	15	Water Treatment & Reuse	Omer Bakshi	Sporian Microsystems Inc.	Integrated Sensors for Water Quality	Kevin Harsh
				Nanosonic Inc.	Wireless Networked Sensors in Water for Heavy Metal Detection	Hang Ruan
		Process Eff & Heat Utilization		Carnegie Mellon University	Evaluating the Techno-Economic Feasibility of Forward Osmosis Processes Utilizing Low Grade Heat: Applications in Power Plant Water, Wastewater, and Reclaimed Water Treatment	Meagan Mauter
				University of Illinois	An Integrated Supercritical System for Efficient Produced Water Treatment and Power Generation	Seyed Dastgheib

TRACK B (CROSSCUTTING)

	Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter
8:30 AM	12	AUSC Materials	Vito Cedro	Energy Industries of Ohio Inc.	Advanced Ultra-Supercritical Component Testing	Robert Purgert
				ORNL - Oak Ridge National Laboratory	Properties of Advanced Ni-Based Alloys for A-USC Steam Turbines	Phil Maziasz
				ORNL - Oak Ridge National Laboratory	Materials Qualification and Deployment for High Efficiency Coal Fired Boilers	Bruce Pint
10:30 AM	13	AUSC Materials	Rick Dunst	Alstom Power, Inc	Adv Ultrasupercritical Materials Thick-Walled Cycling Header Development for Comtest-AUSC	Buchi Ganta
				ORNL - Oak Ridge National Laboratory	Corrosion Issues in Advanced Coal Fired Boilers	Bruce Pint
1:00 PM	14	Advanced Manufacturing	Vito Cedro	PNNL - Pacific Northwest National Laboratory	Low Cost Fabrication of ODS Materials	Glenn Grant
				ORNL - Oak Ridge National Laboratory	Microstructure and Properties of Ni-based Components fabricated by Additive Manufacturing	Sebastien N. Dryepondt
				PNNL - Pacific Northwest National Laboratory	Solid State Joining of Creep Enhanced Ferritic Steels	Glenn Grant
3:00 PM	15	Structural Materials	Karol Schrems	ORNL - Oak Ridge Natl Lab	Advanced Materials Issues in Supercritical Carbon Dioxide	Bruce Pint
				NETL - Research and Innovation Center	Status of NETL Superalloy Development: Melt Processing & Heat Treatment	Paul Jablonski
				NETL - Research and Innovation Center	Heat Resistant 9 Cr Steels: Creep Analysis Comparisons	Jeff Hawk
				NETL - Research and Innovation Center	Concentrated Solid Solution Alloys: Computational Modeling and Experimental Validation	Michael Gao

TRACK C (CROSSCUTTING)

	Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter
8:30 AM	12	Direct Power Extraction	Jason Hissam	NETL - Research and Innovation Center	Analysis, Simulation, and Experimental Validation for MHD Energy Conversion	Rigel Woodside
				NETL - Research and Innovation Center	Effect of potassium carbonate on electrodes in a high-velocity oxy-fuel combustion flame	Peter Hsieh
				University of Texas at El Paso	Combustion Synthesis of Boride-Based Electrode Materials for Magneto Hydrodynamic (MHD) Direct Power Extraction	Evgeny Shafirovich
10:30 AM	13	Direct Power Extraction	Maria Reidpath	University of Texas at El Paso	High Temp High Velocity Direct Power Extraction Using an Open Cycle Oxy Combustion System	Norman Love
				Florida International University	Novel High Temperature Carbide and Boride Ceramics for Direct Power Extraction Electrode Applications	Andres Behrens
1:00 PM	14	Direct Power Extraction	Otis Mills	University of Washington	Precursor-Derived Nanostructured Silicon Carbide Based Materials for Magnetohydrodynamic Electrode Applications	Fumio Ohuchi
				Regents of the University of Idaho	Boride Based Electrode Materials with Enhanced Stability under Extreme Conditions for MHD Direct Power Extraction	Indrajit Charit